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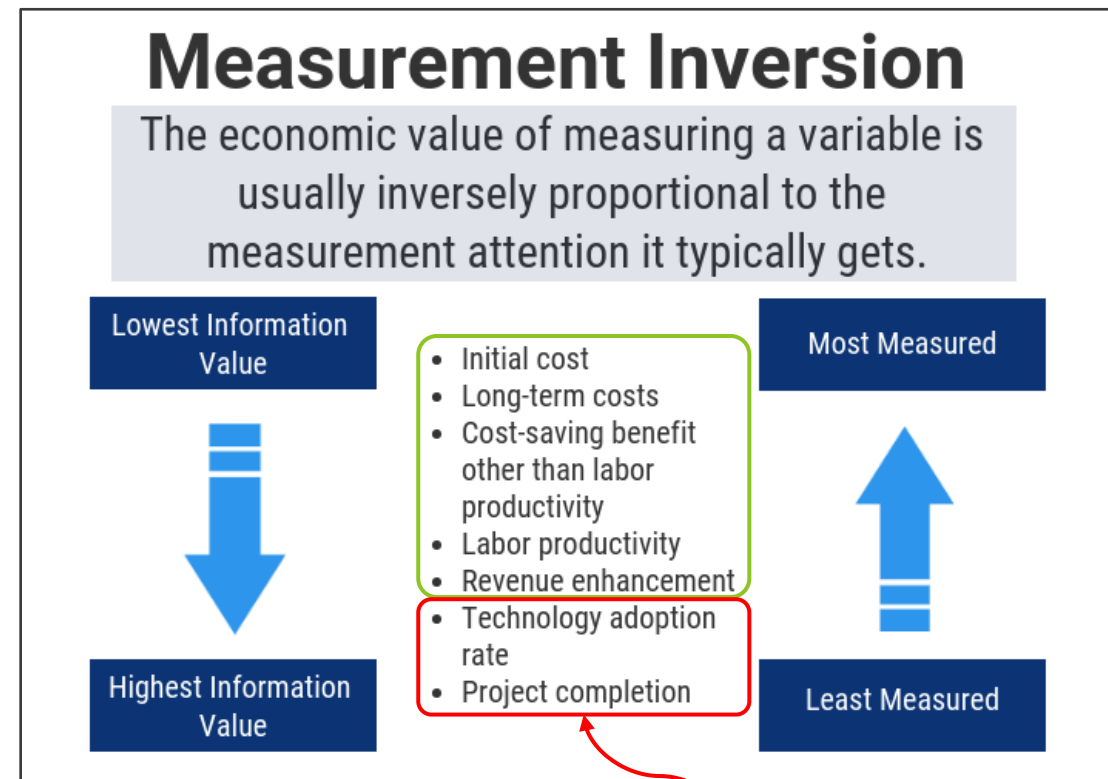
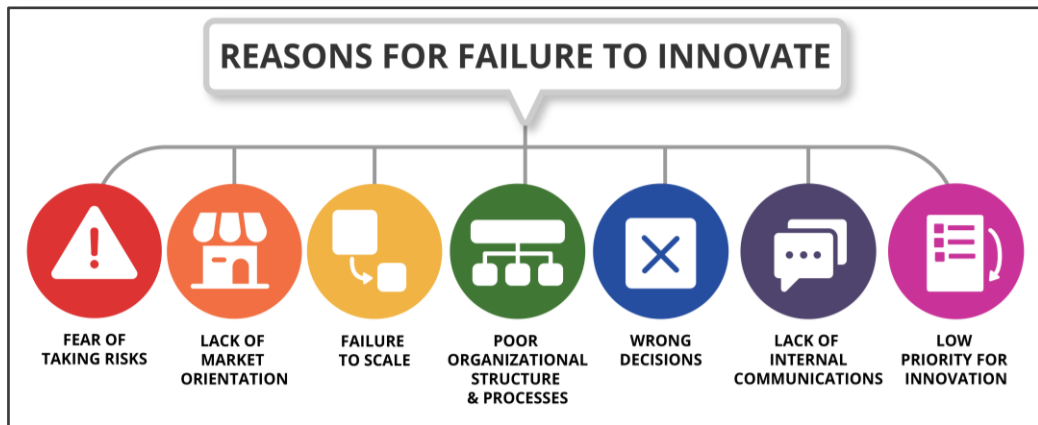
# Risk-informed Cost-Benefit Analysis for Evaluating Nuclear Innovations

Technical, Economic, Risk, and Adoption (TERA) Framework



# Evaluation of technology innovation projects is often overlooked and oversimplified

According to a 2017 study, **40–90% of innovation projects fail**, depending on the nature of the innovation.<sup>1</sup>

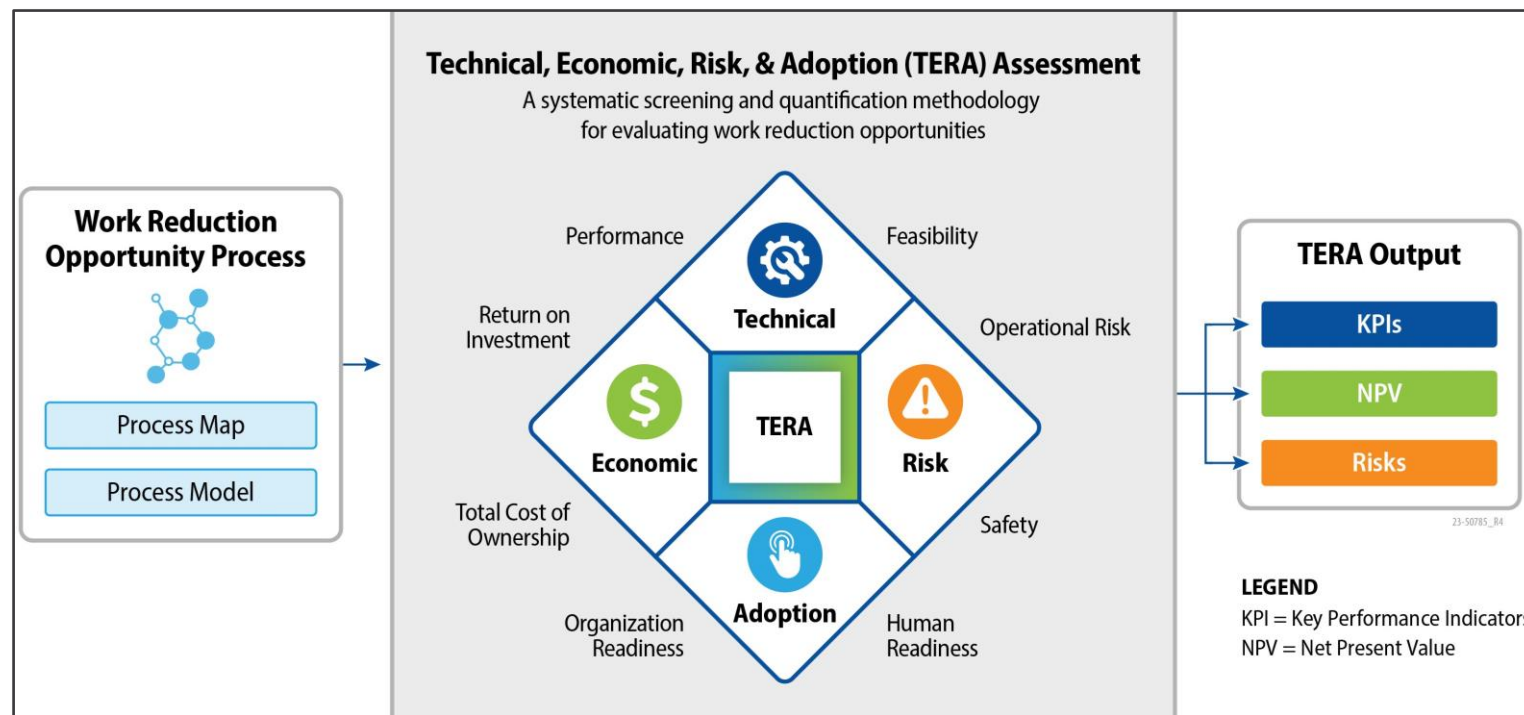


**These cause the most problems, but are not measured often.**

<sup>1</sup> Hubbard, Douglas W. How to measure anything: Finding the value of intangibles in business. John Wiley & Sons, 2014.

# The TERA framework measures facets of the innovation projects and connects them to economic KPIs

- A quantitative method to systematically **identify, evaluate, and prioritize modernization investments** in nuclear power plants to reduce inefficiencies and operational costs.
- TERA provides a structured evaluation methodology of new technologies that:
  - **Maximizes return on investment** by focusing on high-potential projects.
  - **Enables risk-informed decision making** and ensures smoother implementation of innovative solutions.
  - **Streamlines decision-making** processes for modernization efforts, leading to faster innovation cycles
  - **Enhances operational efficiency** by identifying and mitigating potential risks early



# The TERA evaluates four key areas of a technology solution

## Technical



### Technical Assessment

- Process mapping
- Process modeling
- Technology modeling
- Performance
- Feasibility

## Economic



### Economic Assessment

- Process costs
- Potential savings
- Investment costs
- Operational costs
- Net present value

## Risk



### Risk Assessment

- Safety
- System integration
- Technology readiness
- Unintended consequences
- Security

## Adoption



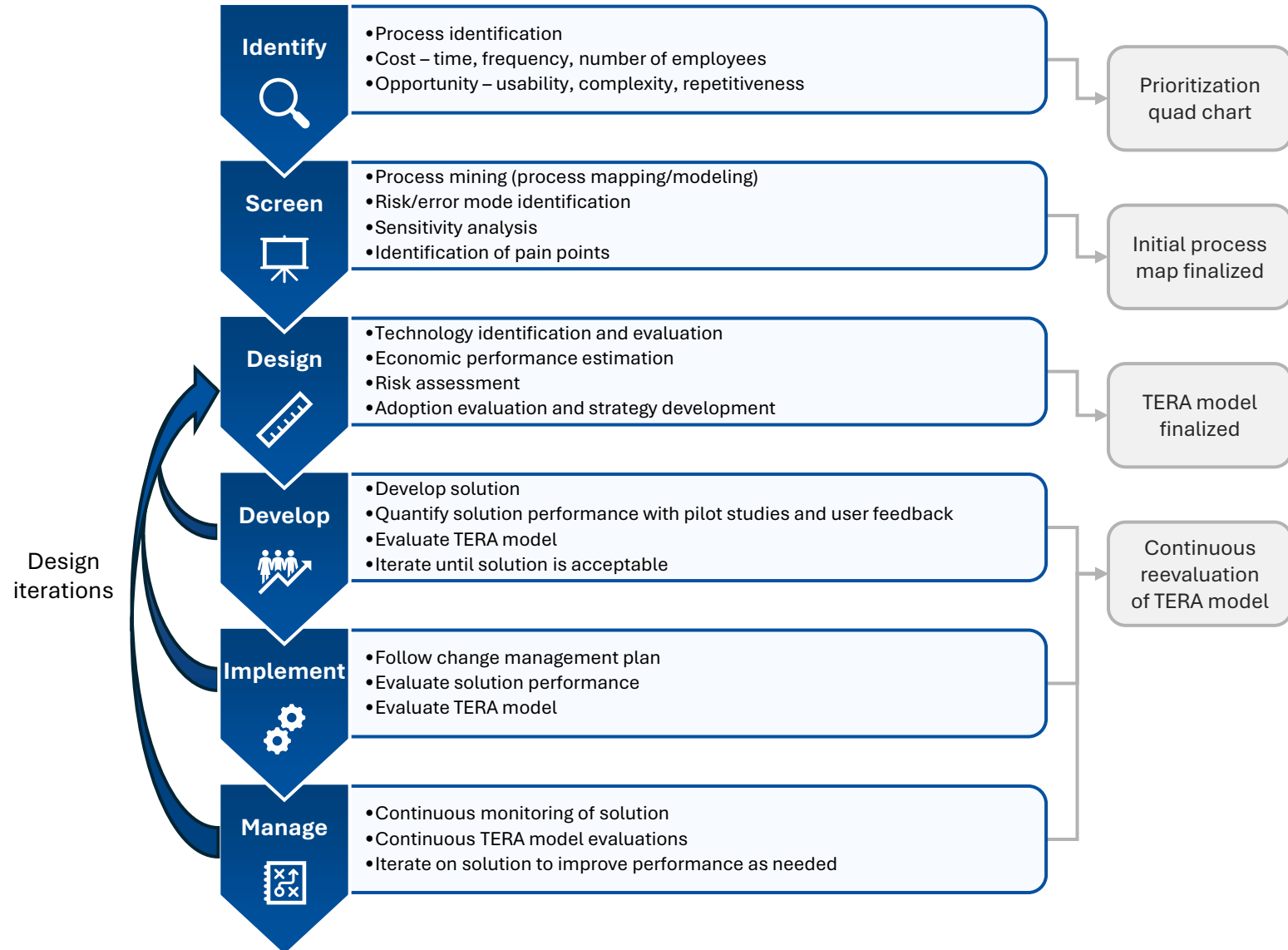
### Adoption Assessment

- Human readiness
- Organizational readiness
- User acceptance
- Trustworthiness
- Change management

# Dynamic TERA process

## Focus of this project:

1. Map current process through stakeholder engagement
2. Turn process map into a quantitative model
3. Evaluate potential technologies for feasibility and performance
4. Alter process model with new technology
5. Evaluate new process for change in costs or benefits
6. Create development and implementation strategy



# Day 2 - Session 3 - Digital Infrastructure and Modernization Strategy

Wednesday, December 4, 2024  
10:00am – 1:00pm (EST)

Time (EST)	Topic	Speaker - Organization
10:00 - 10:05	Introduction	Jeffrey Joe, INL
10:05 - 10:30	Innovative Approaches to Digital I&C Sustainment	Sean Lawrie, Lumera
10:30 - 10:55	A Risk and Economics-informed Evaluation of Work Management Automation Technologies	Christianna Howard, Sargent & Lundy
10:55 - 11:20	Technology Deployment Plan for Emerging Technologies in Nuclear Power Plants	Alex Tylecote, Scott Madden
11:20 - 11:45	I&C Insights from the Limerick Safety Related Systems Upgrade Project	Scott Schumacher, Constellation
11:45 - 12:30	General Q&A and Session Wrap Up	Jeffrey Joe, INL
12:30 – 01:30	Lunch Break	





## Sustaining National Nuclear Assets

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